THE ADVOCATE OF SCIENCE.

Vol. 1.] KNOWLEDGE IS POWER—HAPPINESS—VIRTUE. [Nos. 21 & 22.

Wm. P. Gibbons, S. W. cor. of 6th and Cherry sts. PHILADELPHIA, EIGHTH MONTH 15, 1833. Semi-monthly.—One dollar for 50 Numbers

For the Advocate of Science.

GEOLOGY, No. 13.

Recapitulation.—My last number concluded the examination of the *alluvial* and *diluvial* formations. The flood of Deucalion, about the year 1500 B. C., that of Attica, 1200 B. C., and that of Syria, 700 years ago. The deluge of Noah, 1656 years after the creation, and 2348 B. C. Heathen traditions concerning it. Remains of antediluvian animals, destroyed by the deluge. The mammoth of Siberia and the mastodon of America. The Kirkdale cavern, and other caverns in Europe &c., filled with the bones of animals which are supposed to have taken shelter therein, from the flood. Bigbone lick, in Kentucky, an extensive depository of the bones of the mastodon, elephant, ox, elk, deer &c., entombed by the universal deluge.

Volcanic and basaltic rocks.—We have yet to examine one other class of rocks, including *basaltic* and *trap rocks*, and *volcanic* productions. These, unlike most others that we have considered, do not observe any fixed principles with regard to their stratification and their position, being nearly always situated between or upon the other strata, in unconformable beds and masses. They appear to have been deposited at different periods of time, and to have been ejected in a melted state upon the bottom of the sea, from volcanoes beneath, or poured into cavities and fissures in the other formations.

Composition of basalt, &c.—The principal ingredient in the composition of *basalt*, is a mineral called hornblend, which is also very often met with in lava. The color of basalt is a dark green. It is somewhat soft, so as to be cut slightly with a knife.

Basalt often occurs in dykes.—When treating of coal, I gave a brief description of a basaltic dyke, which is a common occurrence in coal mines, and always elevates the strata on one side of it. These dykes of basalt are not confined to coal strata, but are occasionally found cutting through nearly every kind of rock. The largest one of which we have an accurate description, is the Cleveland dyke, which has been traced to a distance of seventy miles across the northern part of England, and terminates in the German ocean. In the greater part of its course, this immense wall appears on the surface of the earth, where it is from ten to twenty yards in width; intersecting the strata of limestone, chalk, coal and other mineral substances which have been formed at very different periods of time.

The Giant's Causeway.—In the north of Ireland is an extensive formation of this kind of rock, a part of which is called the Giant's Causeway. This is a natural wharf, thirty-five feet in height, projecting some distance into the sea, and constructed entirely of columns of basalt, fitted into each other. These columns are several feet through, and one or two feet long. The base of each column or section presents a convex surface, which fits into a corresponding concavity on the top of the section beneath.

The island of Staffa and cave of Fingal.—The island of Staffa, one of the Hebrides, is composed entirely of a similar arrangement of basaltic pillars. At one margin of this singular and imposing specimen of natural architecture, the scenery of which is characterized by its extreme wildness, is the celebrated cave of Fingal, immortalized by the tuneful harp of Ossian.

Other varieties of basalt.—Besides the columnar form, basalt also occurs in globular masses. It is sometimes observed, moreover, with no definite form.

No basalt in the United States.—In this country, no well characterized basalt has yet been found. Some rocks, of the other varieties to be hereafter described, resemble it very strongly.

Is basalt the result of fire or water?—The origin of basaltic rocks was long a subject of dispute with geologists. Whilst one class of naturalists ascribed them to the operation of heat, or of subterranean volcanoes, the followers of Werner, with their wonted dread of fire, advocated the aqueous theory, which supposes that they are the result of a deposition from water. The question appears however to be decided in favor of the igneous hypothesis. Their close alliance with rocks known to be volcanic—their effect on the position of those strata which they intersect, twisting and displacing them, and thus showing themselves to have always been troublesome neighbors—the burnt and sooty condition of the coal which is in contact with dykes—the crystalline appearance of limestone in the same situation—and the crystals of sulphur which are observed on the roof of the coal beds in their vicinity, furnish almost incontestible evidence to prove that fire was an important agent in their formation.

Were dykes formed from above, or from beneath?—By admitting this to be a fact, we also grant another proposition which was long and warmly disputed,—that basaltic dykes were filled from beneath, and not by the pouring in of the materials from above. The Cleveland dyke, before noticed, grows wider in its descent—a circumstance that can only be explained by adopting the above explanation.

Trap rocks.—I have mentioned *trap* rocks as belonging to this class. They are allied in their composition to basalt, being composed principally of hornblend, which is blended with quartz in various proportions. Their name is derived from the Swedish word, *trappa*, a step, or stairs, and they are so called from the circumstance of their occurring in the form of steps, and being liable to break in the same form.

Localities of trap.—This kind of rock is found in many places in the United States. There are several localities of it near Philadelphia. It abounds along the course of the Brandywine creek, imparting to this stream its wild and romantic scenery. The palisades on the Hudson are of the same material. It is one of the hardest of rocks. In building, it is much used, and large quantities of it have been supplied to the Breakwater in the Delaware.

Porphyry and greenstone.—Porphyry is a rock of this class, containing distinct crystals of feldspar or hornblend. It is extremely hard, and has been employed on this account, for vases and other purposes. *Greenstone* is allied to basalt and trap, being likewise composed chiefly of hornblend. There are several extensive quarries of this variety of rock, on the Delaware river, at Quarryville, which have furnished large supplies to the Breakwater, and also for purposes of architecture.

Origin of trap, porphyry &c.—All the varieties of rock which I have considered, pass into each other by insensible gradations, and present characters so analogous that we can scarcely avoid referring them to the same origin. If, therefore, an igneous origin be conceded to basalt; trap, porphyry and greenstone would also appear to have resulted from the action of fire.

The remaining section of this class consists of volcanic formations. The subject of volcanoes I will take up in my next number. S.

For the Advocate of Science

ON THE INSTINCT OF PLANTS.—*Continued from page 76.*

It may not be amiss to notice in this place, the curious provision afforded to many seeds for their dissemination. The wild oat is a familiar instance, and our native geraniums also furnish examples of the same nature. Each seed has a long process or awn attached to it, which by being alternately straightened and bent by changes in the moisture of the atmosphere, sometimes conveys the seed to a considerable distance from its original location. Advantage has been taken of this circumstance, in the application of the awns for the purpose of Hygrometers. The awn or beard of barley is covered with small barbs, which are pointed in a direction contrary to the seed. This long awn becomes lengthened by the dew of night, and pushes forward the grain of barley. During the day, it draws up its pointed end in drying; and thus creeping along, always in

the same direction, will often travel many feet. These migrations are purely mechanical, and entirely independent of any vital operations. How the seed became furnished with such ample means of locomotion, whether in consequence of an instinctive knowledge of its wants, or by the intervention of some exterior agent, we will not determine. Those will perhaps believe the former, who credit Montaigne's story of the Italian king, who after dreaming all night of bull fighting in which he was engaged, found the next morning that his forehead was adorned with a promising pair of horns!

The influence of moisture, air, light, and heat, in determining the more vigorous growth of plants in the direction from which these stimuli proceed, would furnish a very interesting subject for an entire essay. I will only remark that unless the plant is beyond the sphere of their physical operation, no instinctive attribute is required in the rationale of its approach to the source of those stimulating agents. It has been supposed that the upward growth of vegetables towards the surface of the earth when the seeds are planted, is connected in some way, with gravitative attraction. In reference to this subject I will quote an interesting experiment of the celebrated John Hunter. Having set beans in a tub filled with earth, which had perforated apertures in various directions, he contrived mechanism to keep it constantly revolving round an axis, to show that the ordinary operation of gravitation had no effect in producing the extremely varied course which the young plants took, in order to arrive at the surface. A cucumber vine will turn from its course to approach a vessel of water placed a short distance from it; and the same may be said of the growth of plants towards an aperture through which light is admitted into the apartment that contains them. Now, until it is proved that seeds will grow towards the surface, when planted beyond the influence of the atmosphere—that the vine receives no physical impression from the adjacent water—nor the plant in the house any actual stimulation from the light—we need not resort to instinct to aid us in the explanation of these phenomena.

Of voluble plants, some twine around their support from east to south and west, and others in the opposite direction. The cause of these peculiarities is not ascertained, but must be sought for in the original physical organization of the seed. The plant itself makes no choice in this matter, the same species always observing the same unchangeable course.

But there are certain operations of the vital principle of vegetables which have stronger claims to the existence of a presiding intelligent faculty in the individual plant. Such are the motions exhibited by the class of plants called *sensitive*, whose leaves collapse immediately when any part of the plant is injured—the closing of some flowers to entrap insects that attempt to prey upon them—the approaching and receding of the stamens and pointals of flowers—and various other movements which are thought by some to evince the existence of sensibility and sensation, and consequently of a *sensorium commune*, or centre of perception.

The *mimosa*, or sensitive plant,* will serve to illustrate the extreme delicacy of some vegetables. The leaves of this plant are placed opposite each other, on the main footstalk, and approach in pairs so as to protect the upper respiratory surface, when cold, moisture, or any mechanical irritant is applied. The mimosa and several others have acquired the title of *sleeping* plants, from this peculiar arrangement of the foliage by night.

The Sarracenia *purpurea*, or side-saddle flower, an inhabitant of the swamps of New Jersey, has a structure of the leaves fatal to many insects. They are hollow cylinders, several inches long, and one or more in diameter, furnished with a cap, or hood, which closes like a valve upon the open extremity when the leaf is injured. Insects are fond of entering the cavities, and are then shut in by the lid with which the entrance is provided. These leaves also contain water, by means of which the insects are drowned.

The Dionea *muscipula*, or Venus' flytrap, is a very curious plant, a native of Carolina. The leaves have an oval extremity, bordered with long sharp teeth. They lie spread upon the ground around the stem, fixed exactly as the common steeltrap; and are so irritable, that when an insect creeps upon them, they suddenly fold up, and crush or pierce it to death.

The flowers of a common species of apocynum, or dog's bane, (A. *androsæmifolium*) and several species of *Asclepias*, also found plentifully in our soil, appear to be endowed with a carniverous appetite. The anthers are so arranged as to form a hollow cylinder, at the bottom of which is the honied nectary. Any irritant applied to the flower causes these anthers to approach more closely together, and almost to shut up the extremity of the cylinder. In this way flies and other insects are often entrapped, and held by their proboscis or legs. The most common species of asclepias, (A. *syriaca*) called wild cotton, or milk weed, is an excellent fly-catcher. The first actual demonstration that I had of this, was in a small bunch of its flowers, which, after being detached from the parent stem, were placed in a pitcher of water. On the next day, I chanced to observe a fly entangled among the flowers as they stood by my side, and on close examination, I found several of its feet securely fastened in the chinks of the anthers, as they had closed up to form the cylinder. After two or three hours of laborious toil, during which time it was transported a considerable distance in my hand, for the benefit of my botanical friends, the little prisoner succeeded in extricating himself from the grasp of his fatigued and dying enemy. I have since repeatedly witnessed the same experiment, by holding a fly so that its legs might become entangled in the same manner. The common house fly, however, is generally too strong to be detained a great while by the asclepias.

The motion of the stamens and pointals of flowers at the period of their maturity, is another striking feature of vegetable life, which has led some physiologists to exalt the character of plants nearly to a level with the animal creation. In some of them the stamens move one by one, towards the pointal, and in others the pointal alternately approaches and recedes from the different stamens. From facts like these did Darwin gather his fanciful notions of the loves and marriages of plants.

The extent to which the poet has, in many instances, carried these ideas, is laughable, and tends to the injury of science, by giving it a character repulsive to female delicacy. The stamens and pointals are continually falling in love, and engaged in mutual search of each other—or the husband sets off on a matrimonial voyage, leaving his wife at home to "call her lost lover, and upbraid the skies." In reference to the Collinsonia *canadensis*, a plant that has two stamens and one pointal, he says:

> Two brother swains of Collin's gentle name,
> The same their features, and their forms the same,
> With rival love for fair Collinia sigh,
> Knit the dark brow, and roll the pensive eye;
> With sweet concern the pitying beauty mourns,
> And soothes with smiles, the jealous pair, by turns.
>
> [*Botanic Ga den.*

Not many of our country swains, when they gather the common horse-balm for the benefit of their cattle, nor our fair dairy maids, when they pluck its leaf as a covering for their butter, consider what destructive inroads they make upon the domain of "intellect."

Botanicus.

[*To be Continued.*]

HISTORY OF THE ART OF PRINTING.

Among the most prominent and important of all human inventions, I place that of making books. When I consider all that is involved in making a book, all the wonderful and almost indefinite complication of the separate efforts of thought necessary to this astonishing creation, I cannot but look with respect upon a creature, born the most weak and defenceless of animals, who has yet a mind, in which such astonishing powers inhere, that their natural development originated, by separate efforts, each prodigious in itself, that mysterious mental production, a book.

The era of the invention of letters is lost in the unrecorded ages of mythic tradition. Whether the Hebrew, Chaldaic, Sungskrit, or Arabic alphabet is the more ancient, does not appear. From the nature of the case, the invention must have preceded the record. History and tradition concur in assigning the first recorded knowledge of letters to Cadmus, a Phenician prince, who founded Thebes in Greece, and brought thither from Phenicia the invention of letters, 1519 years before Christ.

Such is the vast interval between the invention of articulate language, and written and arbitrary characters, that to a reflecting mind, it becomes matter of astonishment, how this immense waste was

* There are two species of *mimosa*, commonly called *sensitive plants*, M. *sensitiva*, and M. *pudica*.

passed over. Indeed, to a great portion of the species, it has proved an impassable gulf. That portion has never advanced beyond oral language. They who possess only oral language, are not more raised above the brutes by their rational nature, than we are above them by the natural influence of this single invention.

How many ages must have elapsed, after the invention of written alphabetic characters, before the concurrence of all the arts could have given birth to such a product as a modern book! The most ancient form of books seems to have been thin boards, strung together, covered with wax, and written upon with an instrument called *stylus*, whence probably the derivation of the modern term style.

Ivory, sheet lead, the leaves and bark of trees, bleached and flat bones, succeeded waxen tablets, the inconvenience of which consisted in the ease, with which the characters might be effaced. The disadvantage of these materials consisted in their incapacity to be rolled, or bound together, so as to form that collection of leaves, called, from their original form of being rolled together, a volume. To these. and an infinite improvement upon them, succeeded *papyrus*, whence our term paper. This was the pellicle, or bark of an aquatic Egyptian plant, growing most abundantly in the Nile from ten to fifteen feet in height, and eighteen or twenty inches in circumference. These pellicles, properly prepared, laid at right angles to each other, like the warp and woof of cloth, glued, and pressed together, and smoothed, and polished by rubbing the surface, became a beautiful, though a scarce and expensive paper.

This plant being unknown elsewhere, the supply became unequal to the demand, as writing became an art more generally diffused among the nations. Parchment, or the prepared skins of animals, a most beautiful and durable material, upon which to write, became in many countries a substitute for papyrus. For some kinds of writing it is still in use. Its original Greek name imports, that it was an invention of Pergamus, and it is commonly attributed to Eumenes, a king of that country. But from the testimony of the scriptures, and other ancient records, there can be no doubt, that parchment was an invention of a much more ancient date than the time of Eumenes.

Tables of stone, upon which the decalogue of Moses was written, the stone walls of buildings, temples and monuments, and monumental brass, have been the enduring tablets, upon which history, and the desire of remembrance have recorded, in hieroglyphics, emblems, paintings and inscriptions, events in themselves important, or important in the estimate of the vanity of those who ordered them to be engraved.

In the oriental countries, where the palm tree flourishes, its broad, smooth and firm leaves, of a yellowish white, offered cheap and natural tablets for writing. By many millions of the oriental people, they are used for that purpose to this day. The inner bark of trees, *biblos* in Greek, and *liber* in Latin, has very extensively subserved the same purpose. Hence these two words came afterwards to signify a book.

According to Varro, papyrus was an invention coëval with Alexander the Great, and the building of Alexandria in Egypt. It continued the most general material for writing, and an important article of commerce, until about the fifth century of the Christian era. From that time the paper of Europe was chiefly made from the inner bark of various trees, laboriously prepared. It was an art learned from Spain, into which country the knowledge of it was imported by the Arabs.

Paper of a beautiful, smooth and firm kind was known to the Chinese and Japanese from time immemorial. This is an article, with which commerce has made us all acquainted at the present day. The finest sort of paper of these countries is made of silk. The prodigious amounts of their common paper are made of bark, chiefly from that of a species of the paper mulberry. It is also out of question, that cotton was extensively used, and by various nations, for paper, fifteen hundred years ago.

The very important and essential improvement of making linen paper is claimed as the invention of the Germans, Italians, modern Greeks and the Arabians. In regard to the era of the invention, Ray dates it no farther back than 1470. There are incontestible evidences, however, of its having been used at a much earlier date. It was probably imparted by the oriental nations to the Arabians, by them to the Spanish, and by them to the rest of Europe. In making faithful research, touching the origin of many of the most important inventions, commonly supposed to have belonged to modern times, the truth is brought to light, that these inventions may be traced back from one country to another, until their commencement is lost in the darkness of ages that are without authentic record. Such views, in regard not only to inventions, but to whatever is deemed most beautiful, and of the highest genius in fine writing, caused the famous Scaliger pleasantly to say, "perish those ancients, who have said all our good things before us!"

Paper for three centuries was manufactured on the continent of Europe much better than in England. But since the English have become the greatest manufacturing people in the world, the case is reversed, and they now manufacture the most beautiful paper. The French paper mills, and we may add those of New England maintain an honorable competition with the English, in regard to producing the most beautiful paper. That of New England is much improved by the large importations of linen rags from Germany, which is a country renowned for the abundance and beauty of its linen. Various improvements have been introduced into this manufacture, such as that of giving the sheets any requisite length, by the use of machines for extending the sheets, and particularly by the use of the chloride of lime in bleaching it.

Previous to the invention of printing, all books were written in manuscript.

The business of the scribes was one of immense extent; and readiness and exactness were only acquired by those, who were trained to it, as a profession. So far from its being the fact, as is commonly supposed, that the exactness of the arrangements of the chapters, paragraphs, and artificial divisions of books had its origin in the improvement of printing, that art affected to imitate, in the minutest particulars, the forms andappearance of books from the hands of the scribes. Printers long kept their art a secret, that the books might be sold at the price of manuscript books. To continue the deception, the books were for a long time composed of parchment, like that used for manuscript.

The ink of the ancient manuscripts, the palimpsests, seems to have been something of the nature of charcoal, or lamp black, possessing the property of much more durability, than ink of galls, and sulphate of iron; but with the appended disadvantage of being easily discharged. Many of the remains of the ancient Greek and Roman authors would have come down to us but for this circumstance. The manuscripts were used in the middle ages by monks and scribes, after having discharged the ancient writings, as manuscripts to be rewritten with monkish legends, and lives of saints. Some of the original writings have been restored by discharging the monkish writings, and retracing the original characters.

To be Continued.

THE ADVOCATE OF SCIENCE.

Eighth Month 15, 1833.

The communication of "Scrutator" on "*Franklin's Familiar Letters*," and "American Literature and Science, No. 5," were received too late for his number. They shall appear in our next.

In this number of *The Advocate*, we commence an interesting history of the art of printing, taken from Flint's Lectures. It will be completed in three numbers. Being desirous that each number of our paper should present to its readers a variety of subjects, we are prevented from occupying much space with any one article; and therefore divide the long articles as in this instance.—Our subscribers would do well to preserve the back numbers, so as to gain the full benefit of those articles which are thus published in a series of parts.

A large plum.—A few days since, we saw a plum, which grew in the garden of Edward Townsend, in Chestnut street, measuring 7½ inches in its largest circumference, and more than 7 inches the shortest way. Its weight was full 3½ ounces. In color and form, it resembled the green gage, and was certainly much the largest plum we ever saw. The name given to the variety is the "Walm of Washington."

THE CHOLERA.

Some time back, we hazarded the opinion that the malignant cholera would not reappear this summer in the Atlantic States. Every day tends to render this opinion more probable. The disease has much abated in the West, where it has been very virulent owing in a great measure, we believe, to the free manner in which the inhabitants live. Some of the *temperate* men of the West would be considered quite *intemperate* with us. The citizens of the Atlantic States ought to feel themselves remarkably favored in the comparatively slight infliction which they suffered last year, and their exemption this year. The disease appears to have merely taken up its line of march after resting as usual in its winter quarters, and still continues its westward course. Those places which have been revisited the present season, are those in which the epidemic was arrested or suspended by the accession of the past winter, before it had finished its work of destruction. It has not *travelled backwards*, as is generally supposed, but broke out almost simultaneously in those sections of the Mississippi Valley where it raged a few weeks ago.

The frequency of murders and other enormous crimes in the United States, within the present year, is a subject over which every friend of man must mourn. Doubtless there exist causes of universal operation on the community, to which this state of things is to be ascribed. The investigation of them would be an interesting and deserving theme for the exercise of some philosophic intellect. Certainly the public mind must have been moved or agitated in an extraordinary manner. A morbid condition—a state of disease, prevails in the moral constitution of the nation, the elements of which consist in a wanton license of the worst passions; a depreciation of the value of human life, in consequence of the recent visitation of pestilence, and other causes; the general diffusion and rapid subsidence of violent political excitement; the profuse circulation of pernicious publications, such as the record, fictitious or real, of human depravity—the biography of robbers and murderers, and the confessions of criminals; the influence of example, and so forth. To trace out the bearing and effects of each of these agents on human society, would be a most instructive and useful task, well worthy the labor of the curious moralist, or the Christian philosopher.

DR. GODMAN'S RAMBLES OF A NATURALIST.

Continued from page 78.

The first essay in the "Rambles" is devoted to an account of his exertions to discover a small animal, familiar to us all. Not many people, whose attention has never been directed to pursuits of natural history, would even dream of such a simple and common circumstance as is here recorded, being sufficient to enlist the attention and interest, for days together. On the other hand, had Dr. Godman been seen quietly and alone, pursuing his investigations along a common road, he would have found more people to pity his strange and unromantic and perhaps *depraved* taste, than to admire a propensity whose cultivation insures more enjoyment and happiness to its possessor, than all the fictions of a modern age are capable of affording to the most delicate and sensitive of our intellectual epicures.

One of my favorite walks was through Turner's lane, near Philadelphia, which is about a quarter of a mile long, and not much wider than an ordinary street, being closely fenced in on both sides; yet my reader may feel surprised when informed that I found ample employment for all my leisure, during six weeks, within and about its precincts. On entering the lane from the Ridge road, I observed a gentle elevation of the turf beneath the lower rails of the fence, which appeared to be uninterruptedly continuous; and when I had cut through the verdant roof with my knife, it proved to be a regularly arched gallery or subterranean road, along which the inhabitants could securely travel at all hours without fear of discovery. The sides and bottom of this arched way were smooth and clean, as if much used; and the raised superior portion had long been firmly consolidated by the grass roots, intermixed with tenacious clay. At irregular and frequently distant intervals, a side path diverged into the neighboring fields, and by its superficial situation, irregularity and frequent openings, showed that its purpose was temporary, or had been only opened for the sake of procuring food. Occasionally I found a little gallery diverging from the main route beneath the fence, towards the road, and finally opening on the grass, as if the inmate had come out in the morning to breathe the early air, or to drink of the crystal dew which daily gemmed the close cropped verdure. How I longed to detect the animal which tenanted these galleries, in the performance of his labors! Farther on, upon the top of a high bank, which prevented the pathway from continuing near the fence, appeared another evidence of the industry of my yet unknown miner. Half a dozen hillocks of loose, almost pulverized earth were thrown up, at irregular distances, communicating with the main gallery by side passages. Opening one of these carefully, it appeared to differ little from the common gallery in size, but it was very difficult to ascertain where the loose earth came from, nor have I ever been able to tell, since I never witnessed the formation of these hillocks, and conjectures are forbidden, where nothing but observation is requisite to the decision. My farther progress was now interrupted by a delightful brook which sparkled across the road over a clear sandy bed; and here my little galleries turned into the field, coursing along at a moderate distance from the stream. I crept through the fence into the meadow on the west side, intending to discover, if possible, the animal whose works had first fixed my attention, but as I approached the bank of the rivulet something suddenly retreated towards the grass, seeming to vanish almost unaccountably from sight. Very carefully examining the point at which it disappeared, I found the entrance of another gallery or burrow, but of very different construction from that first observed. This new one was formed in the grass, near and among whose roots and lower stems a small but regular covered way was practised. Endless, however, would have been the attempt to follow this, as it opened in various directions, and ran irregularly into the field, and towards the brook, by a great variety of passages. It evidently belonged to an animal totally different from the owner of the subterranean passage, as I subsequently discovered, and may hereafter relate. Tired of my unavailing pursuit, I now returned to the little brook, and seating myself on a stone, remained for some time unconsciously gazing on the fluid which gushed along in unsullied brightness over its pebbly bed.

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It was now past 12 o'clock, I began to retrace my steps towards the city; and without any particular object moved along by the little galleries examined in the morning. I had advanced but a short distance, when I found the last place where I had broken open the gallery was *repaired*. The earth was perfectly fresh, and I had lost the chance of discovering the miner, while watching my new acquaintances in the stream. Hurrying onward, the same circumstance uniformly presented; the injuries were all efficiently repaired, and had evidently been very recently completed. Here was one point gained; it was ascertained that these galleries were still inhabited, and I hoped soon to become acquainted with the inmates. But at this time, it appeared fruitless to delay longer, and I returned home, filled with anticipations of pleasure from the success of my future researches. These I shall relate on another occasion, if such narrations as the present be thought of sufficient interest to justify their presentation to the reader.

On the day following my first related excursion, I started early in the morning, and was rewarded by one sight, which could not otherwise have been obtained, well worth the sacrifice of an hour or two of sleep. There may be persons who will smile contemptuously at the idea of a *man's* being delighted with such trifles; nevertheless, we are not inclined to envy such as disesteem the pure gratification afforded by these simple and easily accessible pleasures. As I crossed an open lot on my way to the lane, a succession of gossamer spider webs, lightly suspended from various weeds and small shrubs, attracted my attention. The dew which had formed during the night was condensed upon this delicate lace, in globules of most resplendent brilliance, whose clear lustre pleased while it dazzled the sight. In comparison with the immaculate purity of these dew drops, which reflected and refracted the morning light in beautiful rays as the gossamer webs trembled in the breeze, how poor would appear the most invaluable diamonds that were ever obtained from Golconda or Brazil! How rich would any monarch be that could boast the possession of *one* such, as here glittered in thousands on every herb and spray! They are exhaled in an hour or two and lost, yet they are almost daily offered to the delighted contemplation of the real lover of nature, who is ever happy to witness the beneficence of the great Creator, not less displayed in trivial circumstances, than the most wonderful of his works.

No particular change was discoverable in the works of my litte miners, except that all the places which had been a second time broken down were again repaired, showing that the animal had passed between the times of my visit; and it may not be uninteresting to observe how the repair was effected. It appeared, when the animal arrived at the spot broken open or exposed to the air, that it changed its direction sufficiently downwards to raise enough of earth from the lower surface to fill up the opening; this of course slightly altered the direction of the gallery at this point, and though the earth thrown up was quite pulverulent, it was so nicely arched as to retain its place, and soon became consolidated. Having broken open a gallery where the turf was very close, and the soil tenacious, I was pleased to find the direction of the chamber somewhat changed; on digging farther with my clasp knife, I found a very beautiful cell excavated in very tough clay, deeper than the common level of the gallery and towards one side. This little lodging room would probably have held a small melon, and was nicely arched all round. It was perfectly clear, and quite smooth, as if much used; to examine it fully, I was obliged to open it completely. The next day, it was replaced by another, made a little farther to one side, exactly of

the same kind; it was replaced a second time, but when broken up a third time, it was left in ruins. As twelve o'clock approached, my solicitude to discover the little miner increased to a considerable degree; previous observation led me to believe that about that time his presence was to be expected. I had trodden down the gallery for some inches in a convenient place, and stood close by, in vigilent expectation. My wishes were speedily gratified; in a short time the flattened gallery began at one end to be raised to its former convexity, and the animal rapidly advanced. With a beating heart, I thrust the knife blade down by the side of the rising earth, and quickly turned it over to one side, throwing my prize fairly into the sunshine. For an instant, he seemed motionless from surprise, when I caught and imprisoned him in my hat. It would be vain for me to attempt a description of my pleasure in having thus succeeded, small as was my conquest. I was delighted with the beauty of my captive's fur; with the admirable adaptation of his diggers or broad rose tinted hands; the wonderful strength of his forelimbs, and the peculiar suitableness of his head and neck to the kind of life the Author of nature had designed him for. It was the shrew mole, or SCALOPS *canadensis*, whose history and peculiarities of structure are minutely related in the first volume of Godman's American Natural History. All my researches never enabled me to discover a nest, female or young one of this species. All I ever caught were males, though this most probably was a mere accident. The breeding of the scalops is nearly all that is wanting to render our knowledge of it complete.

This little animal has eyes, though they are not discoverable during its living condition nor are they of any use to it above ground. In running round a room, (until it had perfectly learned where all the obstacles stood,) it would uniformly strike hard against them with its snout, and then turn. It appeared to me as singular that a creature which fed upon living earth worms with all the greediness of a pig, would not destroy the larvæ or maggots of the flesh fly. A shrew mole lived for many weeks in my study, and made use of a gun case, into which he squeezed himself, as a burrow. Frequently he would carry the meat he was fed with into his retreat; and as it was warm weather, the flies deposited their eggs in the same place. An offensive odor led me to discover this circumstance, and I found a number of large larvæ over which the shrew mole passed without paying them any attention: nor would he, when hungry, accept of such food, though nothing could exceed the eager haste with which he seized and munched earth worms. Often when engaged in observing him thus employed, have I thought of the stories told me, when a boy, of the manner in which snakes were destroyed by swine; his voracity readily exciting a recollection of one of these animals, and the poor worms writhing and twining about his jaws answering for the snakes. It would be tedious were I to relate all my rambles undertaken with a view to gain a proper acquaintance with this creature, at all hours of the day, and late in the evening, before daylight &c. &c.

For a long time naturalists denied the mole the possession of eyes, so small and inconspicuous are they, and so covered with hair. Its sense of hearing is very acute and its tympanum large, though it has no external ear. It generally works early in the morning and directly after a shower of rain: for this reason it can seldom be caught, since the generality of our kind are not very prone to walk out at either of these periods.

This little animal is among those against whom an inveterate warfare is continually being carried on by man, and for no good reason in the world. So far from being destructive to the interests of the farmer, by filling his ground with its small subterranean avenues, and destroying in its passage much vegetable produce, it preserves more by far, from the destruction of the grub worm and other kinds of molluscous animals, on which it feeds, than it accidentally injures along its secluded track. We say accidentally, because it feeds and lives upon animal food, and it is nothing more than a reasonable privilege it should enjoy, of cutting its way among roots, when necessity requires. And for this single act, it is hunted out by the farmer, and the poor little animal once discovered, is sacrificed without mercy by its potent conqueror.

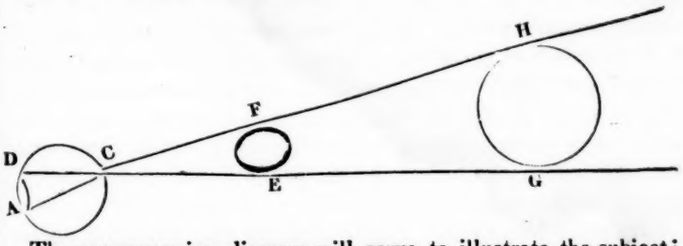
(*To be Continued.*)

ANSWER TO A "QUERIST."

"Why does the moon sometimes appear larger in the horizon than in the mid heaven?"

This phenomenon is attributed by Ferguson to an optical delusion, of which any person may satisfy himself by taking a sheet of paper and rolling it up in a cylindrical form, so that looking through it when the moon is thus apparently enlarged, it will just fill the tube, as it were. By tying a thread round the paper so as to preserve this size of the tube, and looking through it again when the moon is near the zenith and seeming not more than half the magnitude it was before, it will fill up just as much if not more of the tube, as it did before.

When the idea of the correct distance of an object is taken away, we are sometimes apt to attribute its distance to a much further point than it really is. We are thus deceived in foggy weather; small houses are seemingly converted into castles, and little hillocks into mountains, because they appear so dull and ill defined when seen through the mist, that we refer them to a much greater distance than they really are; and therefore, under the same angle we judge them to be much larger.



The accompanying diagram will serve to illustrate the subject: If we suppose the circle ACD to be the eye of a beholder, a near object EF, appears under the same angle as a distant one, GH. And the rays GED and HFA crossing each other at the point C, in the pupil of the eye, limit the size of the picture AD, on the retina; which is the picture of the object EF; and if EF were taken away, it would be the picture of the object GH. But the object GH is much greater than EF; yet being subtended by the same angle as GCH, and the respective distance of the two objects from the eye, as well as the objects themselves, being clearly defined, they both appear of a like magnitude. But if the beholder lose the idea of the real distance of the object EF, owing to the prevalence of a fog, or any other circumstance, and imagine it to be placed in the same spot as the object GH, then it is evident the object EF will appear of the same size as GH, though in reality it is not half as large. This is altogether owing to his referring the object EF to a greater distance than it really is; for the size of the image on the retina is not changed.

So it is in relation to the sun and moon. When they are at the horizon, they are not only seen at a farther distance from the earth—which distance is equal to the semidiameter of the earth—but they are also seen through a much greater quantity of air and vapors, and consequently a much denser medium, than if they were in the zenith. Here are two concurring appearances which deceive the imagination and cause it to refer the sun and moon to a greater distance, at their rising and setting, than they really are. And as they are seen under the same angle both when at the horizon and zenith, the above diagram will correctly apply to this case.

We are not entirely satisfied with this solution of the question. But it is taken mostly from Ferguson, and we will probably refer to it hereafter. We would like to hear from some of our correspondents on the subject.

For the Advocate of Science.

AMERICAN SCIENCE AND LITERATURE.

I HAVE observed in the "Advocate of Science" a series of essays with the above heading, over the signature of "W." Many of the strictures and sentiments of that writer would not be tolerated by the body of society. To the younger class more especially, they

are too true to be palateable. They run counter to the entire current of fashionable notions, and fashionable follies. The popular standard of morals, of taste, is not entirely governed by the principles of utility and of reason; but rather by the authority of usage, the caprice of fashion, and the appetites of the senses. That "the mind makes the man" is become an obsolete proverb, and the young are taught, either by precept or by practice, that the better part of our nature is the sensual propensities—that man is an animal being rather than an intellectual one.

There is no better criterion by which to estimate the taste and character of a people, than the class of reading that is popular with them. The nature of the food which the mind seeks after, is as good a test of the condition of the mind, as the nature of the food which sustains the body, is of the condition of the stomach. Should I observe a lady at the dinner table loading her plate with the strongest food, well covered with mustard and cayenne, and afterwards devouring a mass of tarts, and puddings, and sweetmeats, I should be apt to suspect that her digestive powers would soon give way, and that she would soon be able to eat nothing at all, and to live on pickles, dyspepsia, and hysterics. Should I observe a lady enter a library and select "Paul Clifford," "The Young Duke," or "Miserere," from the midst of a host of instructive and useful books, I should be apt to conclude that she possessed but little sense, except such nonsense as she may have gleaned from novels; and that her mind was the least part of her. Do I see a cart load of melons and cucumbers, and green fruit enter a house, during the prevalence of the malignant cholera in the vicinity, I at once anticipate the appearance of the disease among the inmates of that house. Do I enter a town in which all the books are novels, and all the newspapers are stuffed with simple tales, vulgar anecdotes, doggerel rhymes and senseless riddles, I suspect that the good citizens of the place are pretty far gone in intellectual collapse. The same of a nation; national taste and national character may be estimated by the same method.

These remarks were prompted by the perusal of an editorial paragraph in the "National Gazette," which is too good to be lost. It runs as follows:—

"We are sorry to see the annunciation of a new periodical work entitled '*The Terrific Register, or Records of Crimes, Judgments, Providences, and Calamities.*' It is not the better for being a reprint of a London work, where the most atrocious crimes are numerous, and the accounts of them gross or *terrific* in the highest degree. These cannot but injure youthful readers and all persons of weak mind and excitable imagination. Atrocious deeds often proceed from disordered fancy; as often, perhaps, as from depravity of heart. There are springs of action and infirmities in our nature, upon which such narratives of blood, turpitude, or *calamity*, may operate in a lamentable way. Strength of intellect, moreover, is required to extract the salutary moral, and obtain the right interpretation of *Judgments* and *Providences*. For our own parts, there is scarcely any work—any equivocal, at least,—which we would not rather see enter into families as regular reading, than the one above mentioned. We are not acquainted with it, but we infer the complection of its contents from the matter of similar publications which we have seen, the horrible and shameless details which are introduced into the London newspapers, and the custom of the London presses generally to pander to curiosity and irregular appetite of what kind soever, reckless of consequences in relation to morality, order, and the balance or equality of individual character. *The Terrific Register* will be only the worse for being 'illustrated by engravings, and the cheapest work ever published.'"

There are few editors in the United States so candid as the writer of the foregoing remarks. It is time for some one to expose the practice of the Editorial corps *generally*, with regard to their notices of new publications. By far the greater number are biassed by selfish notions, and petty jeolousies. To compliment an editor by presenting him with a copy of a new work is apt to ensure a very flattering and laudatory notice of it; and the character of the work is of little or no importance to the honored critic. On the contrary, not to pay such deference to the majesty of an editor will often draw down on the head of the impolitic author a torrent of abuse, well seasoned with affected delicacy, and pretended concern for morality. Hence it follows that little dependence can be reposed in the criticisms of the daily press on the numerous publications of the day. It is gratifying however to perceive that there are a few honorable exceptions to these remarks—a few independent and candid individuals, whose principles are not controlled by base interest, nor bribed by flattery; would that the periodical press were conducted exclusively by such men;—men who have sufficient intellectual and moral worth to enable them to judge correctly, sufficient independence and integrity to resist the enticements of personal and popular favor, and sufficient candor and courage to speak forth what they think. The daily press would then, and only then, be a guardian of the morals and true interests of the community. Then and only then would it serve the cause of morality and virtue, and mental advancement. Then would our newspapers be valuable guides to the young, leading them into the proper path, and directing their minds to those objects from which they may derive instruction and benefit, instead of seducing them out of the right course, and inviting them into the intellectual dram shops, which in the forms of novels, Terrific Registers, and so forth, infest our country in countless swarms. FRANKLIN.

For the Advocate of Science.

The following paragraph, partly taken from the "Richmond Whig," I have observed going the rounds of the newspapers: "Many bets of a small amount were made by a gentleman of this city, that it would rain on the 25th ult., and the event justified his opinion. He says that it has never failed to do so for the last seventeen years. A gentleman in the county of Goochland has a standing bet, which has continued for twelve or fifteen years, that it will rain the first Saturday in August, all of which he has won except in one instance. A gentleman of Baltimore, who has particularly observed the weather for many years, has found that, without an exception, we believe, rain has fallen there on the 10th, 11th, or 12th of May."

I have before me a register of daily observations of the weather, from July 1827, to the present time, kept at Wilmington, Del. During this period of seven years, the 25th of July has been rainy three times, while it has been clear, or nearly so, in the remainder. During the same period, it has rained only twice on the first Saturday in August. During the six years in which the journal embraces the month of May, the 10th, 11th and 12th of that month have been entirely, or nearly clear in 1828, 1831, and 1832; while in the other three years, these days have been more or less rainy.

The assertions contained in the above extract are a pretty fair specimen of the accuracy of a large number of the common observations respecting the weather. It is not possible that so great a difference can exist between our climate and that of Virginia and Baltimore, as would be required to prove the truth of the newspaper

facts. With regard to the weather, the memory cannot be relied on; and the only sure mode of establishing the truth of pretended remarkable occurrences, is by an appeal to a diary, or a record of observations made at the moment. One would have supposed that the chances were in favor of the Baltimore gentleman's correctness; for as May is commonly a rainy month, three days of it do not often pass by without more or less rain. But his marvellous discovery is not more correct than the others.

There is no subject on which we are so liable to be deceived by trusting to our memory, as the weather. Every day we hear individuals of good memories disputing whether or not it rained, or snowed, or blowed, on such a day, a week or a month ago; each one recollecting very distinctly what nobody else can. Besides, by dwelling on a subject, or a supposed fact, the mind becomes impressed with the truth of many an untruth. I once heard of a man who was passing by a cellar window at the instant when another one upset a tub of water on the heads of a company who were dining beneath. The man was so wonderfully pleased with the trick, that he took the credit of it to himself, and went about telling it, with all sincerity, as a trick of his own. It is a matter of common remark, that a man may, by frequent repetition of the same falsehood, finally come to believe it himself. Such is human nature. I believe that the reputed facts in the quoted paragraph, gained credibility by a similar process; and that hundreds of statements on the same and other subjects are in circulation, equally unfounded.

ÆOLUS.

For the Advocate of Science.

THE SUBJECT OF SMOKE CONTINUED.

A great man once began a great speech in a very discursive debate, by referring to the storm-tossed mariner, who finds it necessary, as soon as the clouds are dissipated, to calculate his latitude, and his situation relative to his starting place. It would not be amiss for "Juvenis" and myself to do the same.

Juvenis began by ridiculing the theory of the cause of hazy weather, as given in the "Advocate of Science," and asserting the common notion on that subject. The first essay of Boreas was designed confessedly to rebut the theory of Juvenis by facts; which appears to have been done so effectually as to induce him to relinquish all support of his original position, and ingeniously draw me into a defence which I had not contemplated. All that I had in view in my first essay appears therefore to be conceded by Juvenis.

But I have no objection to do more than refute the theory of Juvenis, by maintaining the position in which I find myself. That a smoky state of the atmosphere may be produced by the operation of some atmospheric cause, analogous in some respects to combustion, and not subject to our inspection, I hold to be no ridiculous notion. I have shown that the elements of smoke exist in the air; the only difficulty in the way of Juvenis is, that I cannot demonstrate with mathematical certainty the mode by which the compound, *smoke*, is formed from its elements. I have stated my opinion, that it is within the range of probability, (not that I require full faith in the proposition) that a process analogous to carbonization may take place in the upper regions of the air, by which the haze of our Indian summer is composed, from its constituents. Now, we do know of processes within the grasp of the chemist, by which a change not dissimilar is accomplished. The action of heat is sufficient to separate the carbon, *in the form of carbon*, from its combination with hydrogen. If Juvenis can prove that no operations are performed in nature that cannot be performed on a small scale in the laboratory of the chemist, then, and not till then, will he prove that my theory is opposed to observation and reason, and that it is totally impossible.

It would be well for Juvenis, before he denies the possibility of any theory on the ground which he has assumed, to reflect on the many phenomena which take place daily around us, entirely at variance with facts, or probabilities, so far as our dim and contracted vision is able to penetrate. I would advise him also to consider the extraordinary changes which have been recently effected in the very elements of matter, by the Voltaic apparatus. The decomposition of the alkalies—the conversion of the diamond into gas—and many other results of chemical science, were even farther beyond the range of probability and rational deduction than is the formation of smoke from carbonic acid gas, or from aqueous vapor.

With regard to what Juvenis calls my charge of false representation against him, he certainly knows that I did not consider him guilty of a wilful perversion of my language; and he ought not to have employed those terms in reference to me. I was sensible that I had never meant to convey the ideas which he ascribed to me, and I believe that my language, if carefully examined, would not bear that construction. This is still my opinion; but Juvenis knows that I did not charge him with a wilful misrepresentation, as his language would imply.

Our readers must be convinced before this time, that it is in the power of Juvenis and Boreas to raise a smoke, if they cannot explain how the weather does it. Will Juvenis be so good as to propose some better theory than mine, or to defend his old one, or to explain how meteors are made?

BOREAS.

JOURNAL OF THE WEATHER

for 7th Month, July, 1833, kept at Wilmington, Del.

	THER'M.			BAROM'TER.			WIND.						
Days Month.	Sunrise.	Mid-day.	11 P. M.	Sunrise.	Mid-day.	11 P. M.	Morning.	Force.	Aft'noon.	Force.	Evening.	Force.	OBSERVATIONS.
1	64	83	73	29.92	29.87	29.85	SW	2	WSW	1	W	0	Clear.
2	68	86	76	.80	.75	.73	SW	2	W	5	W	1	Clear Th. gust.
3	63	73	64	.70	.70	.76	NNE	2	N	1	NW	1	Rain. clear.
4	58	76	66	.85	.88	.95	NW	2	SW	0	W	1	Clear.
5	58	75	65	30.05	30.04	30.03	N	1	NE	1	N	1	Clear.
6	60	72	74	.0	29.95	29.94	S	1	SW	2	S	1	Clear. Th. gust.
7	68	84	74	29.89	.88	.85	NW	1	W	5	W	1	Cloudy. Th. gust.
8	68	88	76	.79	.77	.67	W	2	SW	1	SW	1	Cloudy.
9	72	82	68	.66	.67	.75	NW	1	NW	2	N	1	Clear.
10	61	79	64	.85	.89	.87	E	1	S	1	SE	0	Clear. Aurora.
11	62	82	72	.82	.75	.66	SW	1	SW	1	N	4	Clear. Th. gust.
12	65	84	76	.65	.68	.74	NNW	2	N	1	NNE	1	Clear.
13	70	89	80	.84	.87	.85	E	1	SW	1	O	0	Clear.
14	75	90	73	.80	.70	.70	SW	2	W	5	W	1	Rain. Th. & L.
15	66	78	64	.71	.72	.75	NW	3	NW	2	NW	2	Clear.
16	57	77	68	.81	.82	.85	NW	2	NW	2	NW	1	Clear.
17	64	75	67	.90	.92	.93	NNE	1	N	1	NW	1	Cloudy. Clear.
18	59	75	65	.96	.98	30.03	N	3	N	2	NNE	1	Clear.
19	59	78	69	30.10	30.10	.05	SE	0	S	1	SE	1	Partly clear.
20	65	86	76	29.90	29.95	29.96	NW	2	N	2	SE	2	Clear. Th.showr.
21	70	86	75	.98	.97	.93	E	1	SSE	1	SSE	1	Clear.
22	73	90	77	.94	.90	.91	W	0	NE	5	N	0	Clear. Th. gust.
23	74	85	74	.95	.98	.98	NE	2	S	1	S	1	Clear. Hazy.
24	70	89	73	.95	.90	.87	WSW	1	WSW	2	N	5	Clear. Th. gust.
25	72	76	70	.93	.97	30.80	NE	2	E	2	E	1	Cloudy. Rain.
26	64	79	68	30.05	70.07	.04	E	1	S	1	S	1	Clear.
27	64	82	76	29.95	29.85	29.75	WSW	1	WSW	1	W	0	Clear.
28	72	81	68	.74	.78	.82	NW	3	NW	2	NNE	2	Clear.
29	62	80	70	.89	.89	.80	SE	1	SSW	2	SSW	1	Partly clear.
30	70	82	66	.68	.62	.65	W	4	W	2	N	3	Cloudy. Th. gust.
31	60	75	63	.80	.84	.89	NNW	2	NNW	1	NW	0	Clear.

Note.—In the column representing the "Force" of the wind, 0 denotes calm, or

nearly so, 1 a light breeze, 2 a breeze, 3 a wind, 4 a high wind, and 5 a very high wind. The letters R, T and L denote rain, thunder and lightning respectively.

Rains as follows:—On the 3d, 2.50 inches; 6th, .80 in.; 14th, .20 in.; 20th .30 in.; 22d, .40 in.; 24th, .40 in.; 25th, .15 in.; 30th, .45 in.

SUMMARY.

Average at sunrise, thermometer	65°.58	—barometer	29.87 inches,		
Do. at mid-day,	do.	81°.48	do.	29.86	do.
Do. at 11 P. M.	do.	70°.61	do.	29.86	do.
Monthly mean, (2 obs.)	do.	73°.53	do.	29.865.	do.
Maximum, (14th,& 22d)	do.	90°	do. 19th	30.10	do.
Minimum, (16th)	do.	57°	do. 30th	29.62	do.
Range,	do.	33°	do.	.49	do.
Warmest day, 14th,	do.	82°50			
Coldest day, 5th,	do.	66.°50			

Northerly Winds prevailed, (proportion,)	12 days	Proportion of cloudy weather,	9 days.
Easterly, do.	7 do.	Whole days clear,	18 do.
Southerly, do. (S. to S.W.)	12 do.	Days on which rain fell,	11 do.
Proportion of clear weather,	22 do.	Quantity of rain,	6.10 in.

Observations.—A brilliant aurora, on the 10th, followed the next evening by a heavy thunder storm from east of north, and in two days by an effort at an easterly storm. Clouds very frequently electrified, lightning being observed on 15 days. Thunder gusts frequent, and often heavy. Rains frequent, and generally transient and moderate; it did not rain more than three or four hours together, during the month. But one easterly storm, and that slight and of short duration. Winds very changeable, and occasionally very high during gusts. Mean temperature rather higher than the average for July. Several very warm days, though none excessively hot, the mercury not rising above 90°. The warmest weather we have had from the summer of 1830 until this, was only 88½°; this month, therefore, had four days warmer than any day for the last two years.

MISCELLANIES.

1. *Balloon Navigation.*—It is, perhaps, not too much to hope, from the astonishing progress of modern chemistry, our more perfect acquaintance with the components of the air, especially those of the higher strata of the atmosphere, the more extended application of steam, as a propelling power, and the use of gum elastic in forming the body of balloons, that the art of guiding them in the air will at some future period be carried to some practical and useful degree of perfection, possibly to the extent of using them as vehicles of conveyance, especially in time of war. We do not consider it visionary to hope that, in the generations to come, the æronaut will be able to guide his balloon through the air, as the mariner steers his vessel over the seas, casting his anchor in space, or hoisting sail, and emulating the course of the eagle in mid air.—*Flint's Lectures.*

2. *The Marquis of Worcester's account of his Invention of Steam Power.*—"I have invented an admirable and forcible way to draw up water by fire; not by drawing or sucking it upwards, for that must be, as the philosopher terms it, *intra sphæram activitatis*, which is at but such a distance. But this way hath no bounder, if the power be strong enough. For I have taken a piece of whole cannon, whereof the end was burst, and filled it three quarters full of water, stopping and screwing up the end, as also the touchhole, making a constant fire under it. Within twenty-four hours it burst, and made a great crack. So that, having a way to make my vessels so, that they are strengthened with the force within them, and the one to fill after the other, I have seen the water run, like a constant stream, forty feet high. One vessel of water, rarefied by fire, driveth up forty of cold water, and a man that tends the work has but to tend two cocks, that one vessel of water being consumed, another begins to force, and refill with cold water, and so successively, the fire being tended, and kept constant, which the same person may likewise abundantly perform, in the interim between turning said cocks."

3. *Effects of good fortune on different individuals.*—There are instances enough on record, of persons who have been ruined by drawing the highest prize in a lottery. The lower the ignorance of the drawer, the more certain his ruin. Give a guinea to a Scotch peasant, and you put him upon a study how to employ it to the most advantage. Give it to an English peasant, and he will employ it to repair his cottage, or buy new clothes. Give it to an Irish peasant, and he will experience more joy at receiving it than either. He will invite all his friends, treat them to whiskey, lose one day in social drinking, and the next day in sleeping off the effects of it.—*Flint's Lectures.*

4. *The Human Voice.*—Nathan, in his "Essay on the History and Theory of Music," after having mentioned the three classes of vocal sound which are distinguished in the Italian school of singing—namely, the chest voice, (voce de petto) the throat voice or falsetto, and the head voice, (or voce di testa) speaks of a fourth, which he says is almost peculiar to the Jews. This he describes as a species of ventriloquism—a soft and seemingly distant sound produced in the chest and back of the throat and head; an inward and suppressed sound of peculiarly soft and melodious tone. Braham, he says, is the only public singer, whom he has ever heard, who has availed himself of the proper advantages which this feigned voice affords. It is commonly cultivated amongst the Hebrews; it is termed by them "the voice of a child," and Mr. Nathan attributes to their use of it the peculiar sweetness of their style of singing. Mr. Nathan enumerates, among the Jewish musical composers of the present day, Moscheles, Mendleshon, Kalkbrenner, Herts, Mayerbeer, and Paganini.

5. *Preservation of Potatoes.*—To preserve potatoes for several years, nothing more is necessary than to heat them; that is to say, to immerse them for a few minutes in hot water, provided that they be removed before the skin is injured—they will in this way be preserved for a long time, without becoming sour or losing their flavor; it will be necessary however, to be very careful to wipe them dry on taking them out of the water. The heat of an oven will answer as well, if not better than hot water, provided the potatoes are not too dry when put into the oven, so as to break the skin.—*Jour. de Con. Usuel.*

6. *Kneading bread.*—A method of kneading bread, by which will be obtained from the same quantity of flour, a loaf better made and weighing twenty-five per cent more. This result is obtained by boiling for an hour a pound of bran in about twenty pints of water, taking care constantly to stir it with a stick, to prevent the bran from burning at the side or bottom of the vessel. After having strained this liquid through a linen bag or cloth, let it be employed hot to knead the bread with, in the common manner, instead of simple water. The advantage of this bread is that it weighs more, and that it is of much easier digestion.—*Ib.*

7. *Datura stramonium.*—The Stramonium is one of those narcotic vegetables, which, when taken in large quantity, sometimes induce the disease of Tetanus. About the year 1765, when some of the British troops, under Sir John Sinclair, were stationed in the vicinity of Elizabethtown, in East New Jersey, three of the soldiers having collected a quantity of the plant, which they mistook for lambs quarters (CHENOPODIUM *album*,) it being in the spring, when the two plants somewhat resemble each other, they dressed the stramonium of which they eat. One of the men become furious, and ran about like a madman. What was the termination of the case, my informant could not tell. A second was seized with a genuine tetanus, of which he died. The fate of the third person is not remembered.—*Med. and Phys. Jour.*

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